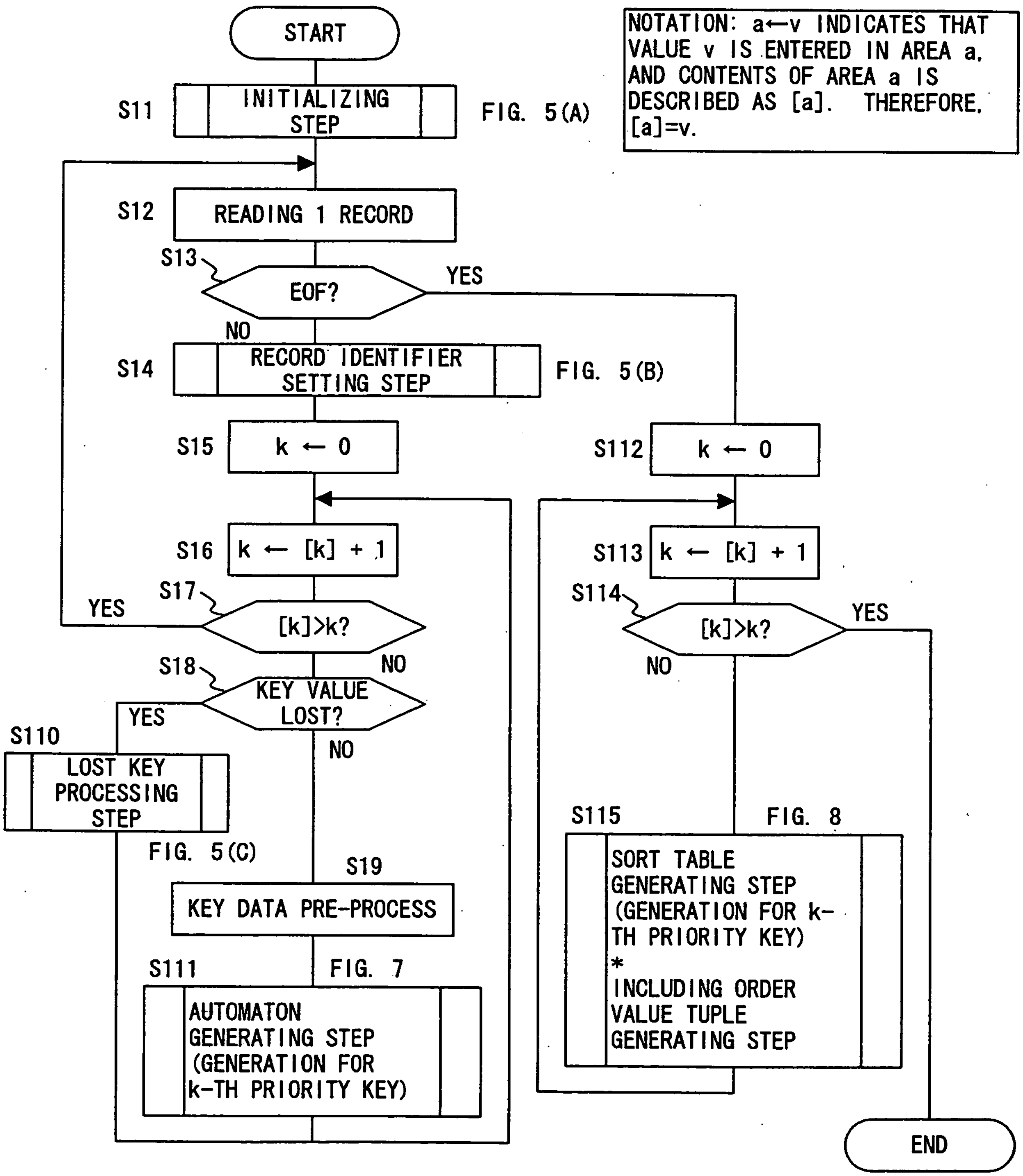
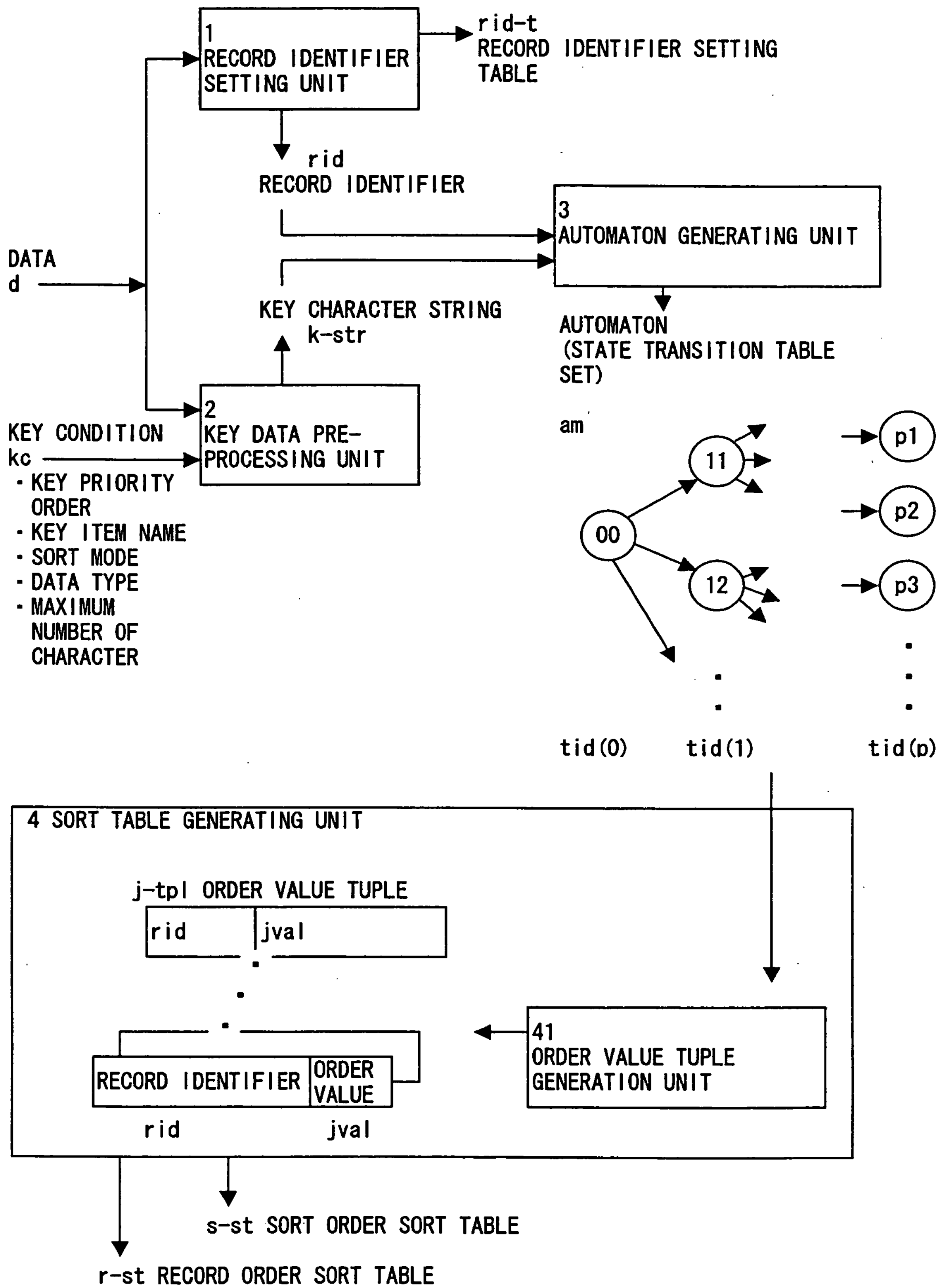


FIG. 1



F I G. 2

(A) EXAMPLE OF SETTING KEY CHARACTER STRING WHEN VALUE OF KEY ITEM IS CHARACTER STRING '富士通' (THREE JAPANESE CHARACTERS)

		NUMBER OF BITS OF CHARACTER UNIT	16	8	4
SJIS CODE 9578 OF CHARACTER '富' (ONE JAPANESE CHARACTER)	KEY CHARACTER STRING k-str	FIRST CHARACTER	9578	95	9
		SECOND CHARACTER	8E6D	78	5
		THIRD CHARACTER	92CF	8E	7
		FOURTH CHARACTER	.	6D	8
		FIFTH CHARACTER	.	92	8
SJIS CODE 8E6D OF CHARACTER '士' (ONE JAPANESE CHARACTER)		SIXTH CHARACTER	.	CA	E
		.	.	.	.
		.	.	.	.
SJIS CODE 92CF OF CHARACTER '通' (ONE JAPANESE CHARACTER)	MAXIMUM NUMBER OF TRANSITION STATES		65536	256	16

(B) EXAMPLE OF CONFIGURATION OF p-TH CHARACTER RECEPTION STATE TRANSITION TABLE WHEN KEY CHARACTER STRING k-str IS A 4-BIT CHARACTER

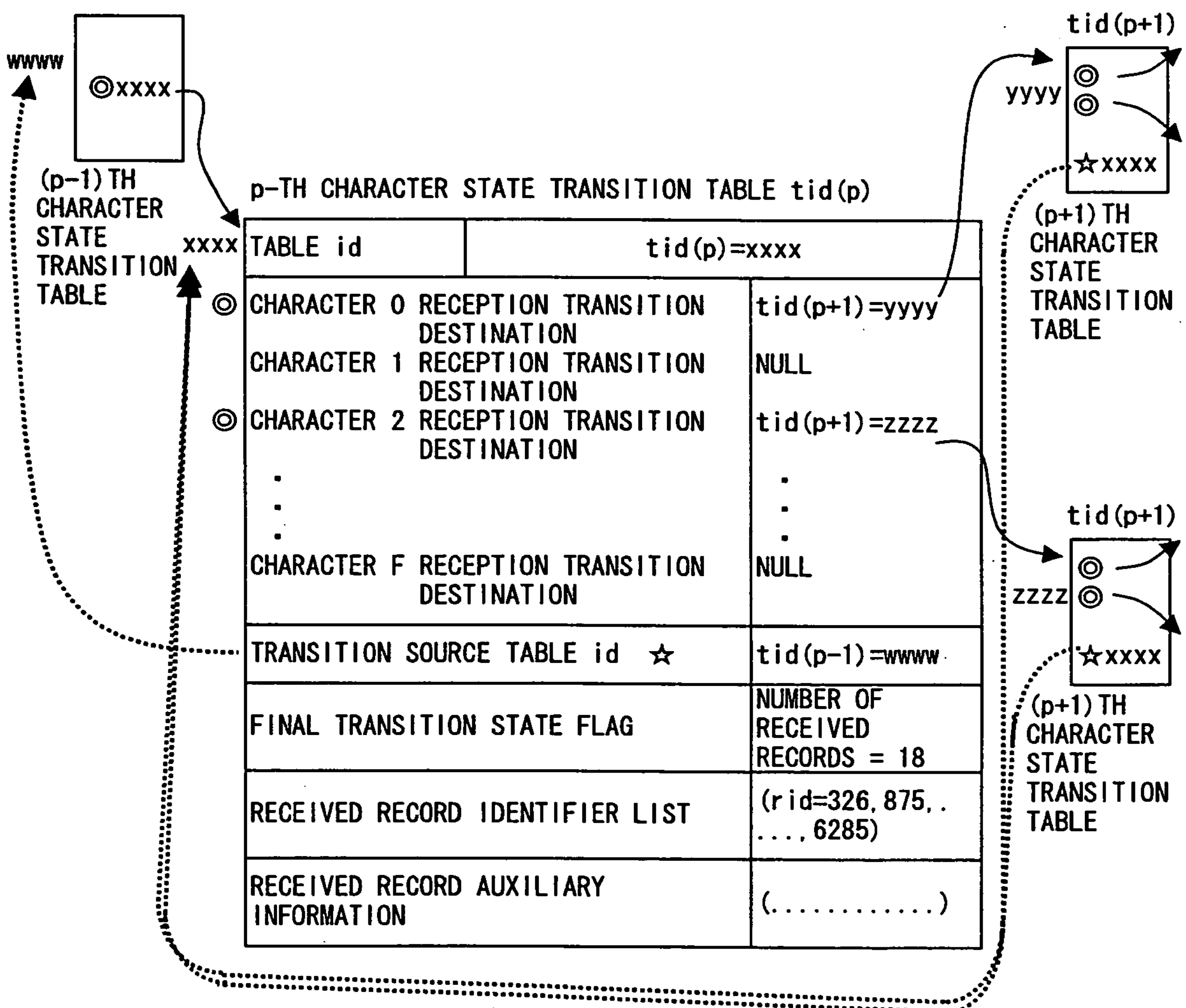


FIG. 3

(A) EXAMPLE OF STRUCTURE OF DATA d

RECORD IDENTIFIER rid = 1 → <PART CODE>15<NAME>安倍太郎(FOUR JAPANESE CHARACTERS)
<FISCAL YEAR IN WHICH THE PERSON JOINED THE COMPANY>90
<SALES>900<R-END>
RECORD IDENTIFIER rid = 2 → <PART CODE>01<NAME>松浦一郎(FOUR JAPANESE CHARACTERS)
<FISCAL YEAR IN WHICH THE PERSON JOINED THE COMPANY>90
<SALES>900<R-END>
· <PART CODE>15<NAME>田端花子(FOUR JAPANESE CHARACTERS)
<FISCAL YEAR IN WHICH THE PERSON JOINED THE COMPANY>92
<SALES>605<R-END>
· <PART CODE>07<NAME>永田正夫(FOUR JAPANESE CHARACTERS)
<FISCAL YEAR IN WHICH THE PERSON JOINED THE COMPANY>95
<SALES>850<R-END>
· <PART CODE>02<NAME>原裕太(THREE JAPANESE CHARACTERS)
<FISCAL YEAR IN WHICH THE PERSON JOINED THE COMPANY>97
<SALES>605<R-END>
RECORD IDENTIFIER rid = Rmax · · · · · · · · · · · · · · · <R-END> EOF

(B) EXAMPLE OF SETTING KEY CONDITION kc

KEY PRIORITY	1	2	3
KEY ITEM NAME	<SALES>	<FISCAL YEAR IN WHICH THE PERSON JOINED THE COMPANY>	<PART CODE>
SORT MODE	DESCENDING ORDER	ASCENDING ORDER	ASCENDING ORDER
DATA TYPE	TYPE = NUMBER 0 SUPPRESS CAN BE SET DECIMAL NUMBER CAN BE SET POSITIVE/NEGATIVE SIGN CAN BE SET ARGUMENT INDEX REPRESENTATION CAN BE SET SPACE INSERTION CAN BE SET FULL/HALF SIZE CHARACTERS CAN COEXIST	TYPE = NUMBER 0 SUPPRESS CANNOT BE SET DECIMAL NUMBER CANNOT BE SET POSITIVE/NEGATIVE SIGN CANNOT BE SET ARGUMENT INDEX REPRESENTATION CANNOT BE SET SPACE INSERTION CANNOT BE SET FULL/HALF SIZE CHARACTER CANNOT COEXIST	TYPE = CHARACTER STRING
MAXIMUM NUMBER OF CHARACTERS	10	—	—

(C) EXAMPLE OF PRE-PROCESSING KEY DATA BASED ON KEY CONDITION kc

KEY CONDITION kc	KEY DATA	INPUT CHARACTER STRING	KEY CHARACTER STRING k-str	NUMBER OF CHARACTERS
TYPE = CHARACTER STRING	-123.456	x2D3132332E343536	x2D3132332E343536	16
TYPE = NUMBER	2 15 03 -123.456	x32 x3135 x3033 x2D3132332E343536	xC0000002 xC080000F xC0000003 x4181E240	8 8 8 8

INTERNAL CHARACTER STRING CHANGE SPECIFICATION OF NUMBER TYPE: FLOATING POINT FORMAT

SIGN PORTION		1 BIT	NEGATIVE = 0, POSITIVE = 1 (*)
INDEX PORTION	INDEX SIGN PORTION	1 BIT	NEGATIVE = 0, POSITIVE = 1 (*)
	INDEX ABSOLUTE NUMBER	7 BITS	
ARGUMENT PORTION	ARGUMENT INTEGER VALUE	23 BITS	

(*) INDICATES DIFFERENCE FROM COMMON ANSI/IEEE STANDARD 754 FLOATING POINT FORMAT.

F I G. 4

(A) EXAMPLE OF DATA STRUCTURE OF ORDER VALUE TUPLE j-tpl AND PLURAL ORDER VALUE TUPLE

RECORD IDENTIFIER rid	FIRST PRIORITY KEY ORDER VALUE jval (1)	SECOND PRIORITY KEY ORDER VALUE jval (2)	...	K-TH PRIORITY KEY ORDER VALUE jval (K)

(B) EXAMPLE OF STRUCTURE OF SORT ORDER SORT TABLE s-st

ORDER VALUE jval	RECORD IDENTIFIER rid
1	301
2	158
3	23
3	1687
5	14
.	.

NOTE) NORMALLY, SAME ORDER VALUE jval CAN CORRESPOND TO A PLURALITY OF RECORD IDENTIFIERS rid

(C) EXAMPLE OF STRUCTURE OF RECORD ORDER SORT TABLE r-st

RECORD IDENTIFIER rid	FIRST PRIORITY KEY		SECOND PRIORITY KEY			K-TH PRIORITY KEY	
	LOST KEY FLAG	ORDER VALUE jval	LOST KEY FLAG	ORDER VALUE jval		LOST KEY FLAG	ORDER VALUE jval
1		251		68			106
2		38		497			184
3	LOSING	max(1)		711			992
4		574		25			78
5		398		56		LOSING	max(K)
6		16	LOSING	max(2)			532
.	.	.	.	.		.	.

NOTE) VALUES OF max(1), max(2), ..., max(K) ARE DETERMINED IN ORDER VALUE TUPLE GENERATING STEP

FIG. 5

(A) EXAMPLE OF OPERATIONS IN INITIALIZING STEP (STEP S11 IN FIG. 1)

RECORD IDENTIFIER SETTING UNIT 1 SETS AREA OF RECORD IDENTIFIER SETTING TABLE rid-t, AND RESETS READ RECORD NUMBER VARIABLE rr (rr ←0). KEY DATA PRE-PROCESSING UNIT 2 READS AND STORES KEY CONDITION kc. NUMBER OF KEY ITEMS IS OBTAINED FROM KEY DATA PRE-PROCESSING UNIT 2, AND AREA OF RECORD ORDER SORT TABLE r-st IS SET. AREA OF SORT ORDER SORT TABLE s-st IS SET. k-TH PRIORITY KEY INITIAL STATE TRANSITION TABLE tid-k(0) IS SET. tid-k(0) = iiii(k)

(B) EXAMPLE OF OPERATION IN RECORD IDENTIFIER SETTING STEP (STEP S14 SHOWN IN FIG. 1)

READ RECORD NUMBER VARIABLE rr←[rr] + 1 (INCREMENT). RECORD IDENTIFIER rid←[rr], STARTING ADDRESS OFFSET VALUE, AND RECORD LENGTH ARE SET IN RECORD IDENTIFIER SETTING TABLE rid-t. RECORD IDENTIFIER rid←[rr] IS ENTERED IN RECORD ORDER SORT TABLE r-st.

(C) EXAMPLE OF OPERATIONS IN LOST KEY PROCESSING STEP (S110 IN FIG. 1)

LOST KEY FLAG IS SET IN RECORD IDENTIFIER rid ROW OF RECORD ORDER SORT TABLE r-st. ADDING 1 TO FINAL TRANSITION STATE FLAG COLUMN OF k-TH PRIORITY KEY INITIAL STATE TRANSITION TABLE tid-k(0), AND RECORD IDENTIFIER rid IS APPENDED TO RECEIVED RECORD IDENTIFIER LIST COLUMN.

(D) EXAMPLE OF STRUCTURE OF RECORD IDENTIFIER SETTING TABLE rid-t

RECORD IDENTIFIER rid	STARTING ADDRESS OFFSET VALUE	RECORD LENGTH
1	0	45
2	45	40
3	85	45
4	130	38
5	168	38
6	.	.
.	.	.

FIG. 6

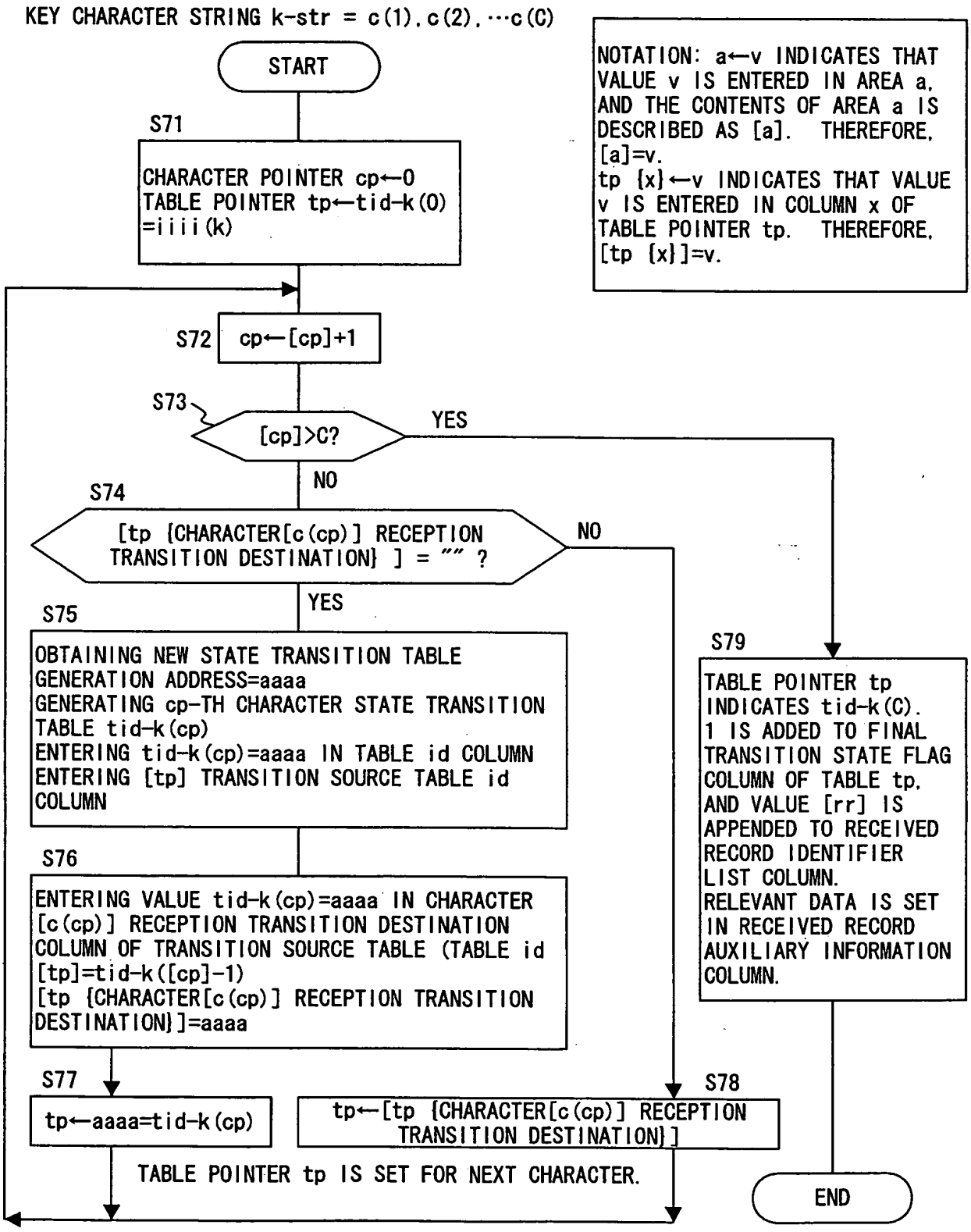
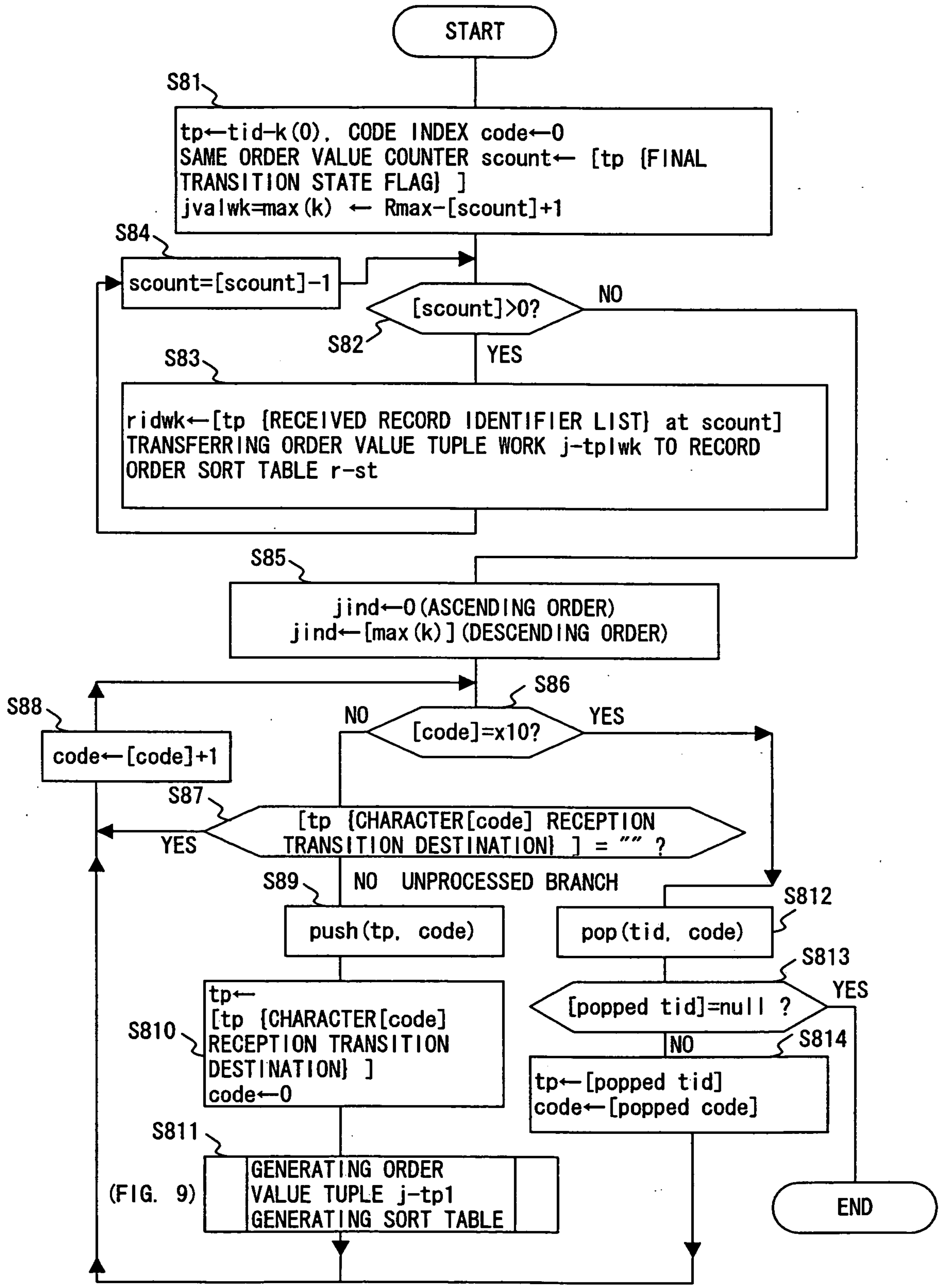
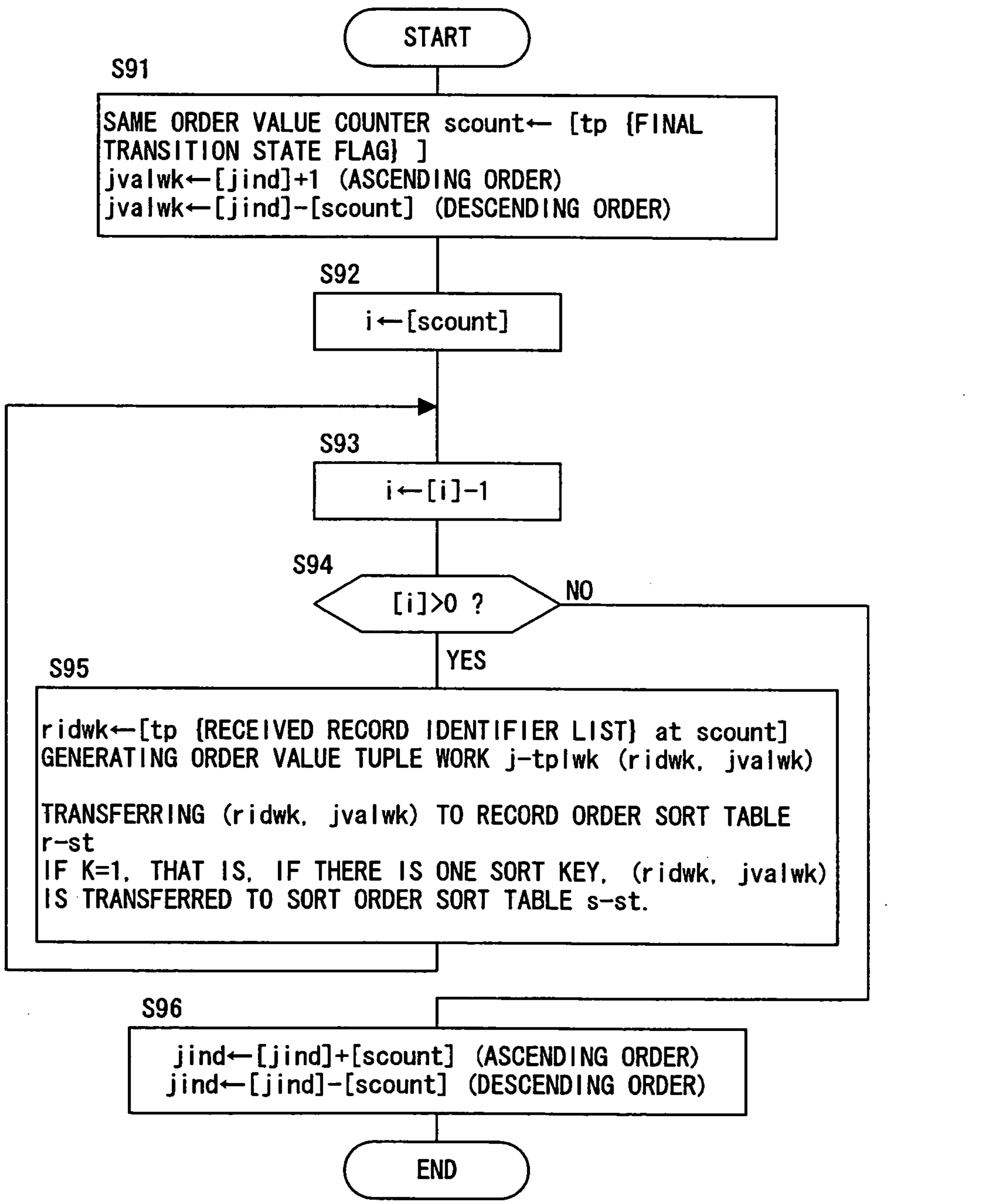


FIG. 7



F I G. 8

INPUT: ORDER VALUE INDEX jind, SORT MODE FLAG sm(k), TABLE POINTER tp
OUTPUT: ORDER VALUE TUPLE j-tpl (ORDER VALUE TUPLE WORK j-tplwk)
RECORD ORDER SORT TABLE r-st; SORT ORDER SORT TABLE s-st (OPTIONAL)
ORDER VALUE INDEX jind



F I G. 9